**IN THE CLAIMS:**

**Please amend the claims as follows.**

1. (Cancelled)

2. (Currently amended) The pulsed eddy current sensor probe of Claim [[1]] 6, further comprising a connector operable to connect said multiplexers to an external device.

3. (Original) The pulsed eddy current sensor probe of Claim 2, wherein said connector is disposed on said sensor array board.

4. (Currently amended) The pulsed eddy current sensor probe of Claim [[1]] 6, wherein said sensors form a linear array on said sensor array board.

5. (Original) The pulsed eddy current sensor probe of Claim 4, further comprising a magnetic shielding disposed between said sensors and said drive coil.

6. (Previously amended) A pulsed eddy current sensor probe comprising:

a sensor array board;

a plurality of sensors arranged on said sensor array board and operable to sense and generate output signals from the transient electromagnetic flux in a part being inspected, each of said sensors having a differential output comprising a positive and a negative output, wherein said sensors are positioned at an edge of said sensor array board, and each of said sensors has an axis of sensitivity that is oriented substantially normal to said edge;

at least one drive coil disposed adjacent to said sensors and operable to transmit transient electromagnetic flux into the part being inspected;

a first multiplexer arranged on said sensor array board and operable to switch between said sensors; and

a second multiplexer arranged on said sensor array board and operable to switch between said sensors,

wherein said first multiplexer is connected to the positive outputs of said sensors, and wherein said second multiplexer is connected to the negative outputs of said sensors.

7. (Original) The pulsed eddy current sensor probe of Claim 6, wherein said sensors form a linear array on said sensor array board.

8. (Original) The pulsed eddy current sensor probe of Claim 7, wherein said sensors comprise giant magnetoresistance (GMR) sensors.

9. (Original) The pulsed eddy current sensor probe of Claim 8, wherein said drive coil extends around said linear array of GMR sensors and is operable to generate a magnetic flux that is oriented in a direction substantially along the axis of sensitivity of the GMR sensors.

10. (Original) The pulsed eddy current sensor probe of Claim 9, further comprising a magnetic shielding disposed between said sensors and said drive coil.

11. (Currently amended) The pulsed eddy current sensor probe of Claim [[1]] 6, wherein said sensor array board comprises a printed circuit board.

12. (Currently amended) A pulsed eddy current sensor probe comprising:

a plurality of sensor array boards;

a plurality of sensors arranged in a linear array on each of said sensor array boards and operable to sense and generate output signals from the transient electromagnetic flux in a part being inspected, each of said sensors having a differential output comprising a positive and a negative output, wherein said sensors are positioned at an edge of each of said sensor array boards to form the respective linear arrays, wherein each of said sensors has an axis of sensitivity that is oriented substantially normal to said edge of the respective sensor array board;

a plurality of drive coils disposed adjacent to said sensors and operable to transmit transient electromagnetic flux into the part being inspected;

a plurality of first multiplexers; and

a plurality of second multiplexers, each of said first and second multiplexers being arranged on a respective one of said sensor array boards and operable to switch between said sensors on the respective sensor array board, wherein each of said first multiplexers is connected to the positive outputs of said sensors on the respective sensor array board,

wherein each of said second multiplexers is connected to the negative outputs of said sensors on the respective sensor array board, and
wherein said sensor array boards are arranged to form a two-dimensional sensor array.

13. (Original) The pulsed eddy current sensor probe of Claim 12, wherein at least one drive coil is connected to a respective one of each of said sensor array boards.

14. (Original) The pulsed eddy current sensor probe of Claim 12, further comprising a plurality of connectors, wherein at least one of said connectors is disposed on each of said sensor array boards, and wherein each of said connectors is operable to connect to said first and second multiplexers on the respective one of said sensor array boards.

15. (Previously amended) A pulsed eddy current sensor probe comprising:

a plurality of sensor array boards;

a plurality of sensors arranged in a linear array on each of said sensor array boards and operable to sense and generate output signals from the transient electromagnetic flux in a part being inspected, each of said sensors having a differential output comprising a positive and a negative output;

a plurality of drive coils disposed adjacent to said sensors and operable to transmit transient electromagnetic flux into the part being inspected;

a plurality of first multiplexers;

a plurality of second multiplexers, each of said first and second multiplexers being arranged on a respective one of said sensor array boards and operable to switch between said sensors on the respective sensor array board, wherein each of said first multiplexers is connected to the positive outputs of said sensors on the respective sensor array board, wherein each of said second multiplexers is connected to the negative outputs of said sensors on the respective sensor array board,

a motherboard connected to each of said connectors,

wherein said sensor array boards are arranged to form a two-dimensional sensor array

16. (Original) The pulsed eddy current sensor probe of Claim 15, further comprising a demultiplexer disposed on said motherboard,

wherein at least one drive coil is connected to a respective one of each of said sensor array boards, and

wherein said demultiplexer is operable to receive a plurality of control signals and a plurality of drive pulses and to selectively drive each of said drive coils in response to the control signals.

17. (Original) The pulsed eddy current sensor probe of Claim 15, wherein at least one drive coil is connected to a respective one of each of said sensor array boards, said pulsed eddy current sensor probe further comprising an enabling circuit adapted to selectively enable a respective one of said sensor array boards via the respective one of said connectors for driving the respective one of said drive coils and for collecting a plurality of output signals using the sensors arranged in said linear array on the respective sensor array board.

18. (Original) The pulsed eddy current sensor probe of Claim 17, wherein said enabling circuit comprises a demultiplexer disposed on said motherboard, wherein said demultiplexer is operable to receive a plurality of control signals and a plurality of drive pulses and to selectively drive each of said drive coils in response to the control signals via the respective connector.

19. (Original) The pulsed eddy current sensor probe of Claim 18, wherein said enabling circuit further comprises a plurality of switches.

20. (Cancelled)

21. (Currently amended) The pulsed eddy current sensor probe of Claim [[20]] 12, wherein each of said drive coils extends around the respective linear array of sensors and is operable to generate a magnetic field that is oriented in a direction substantially along the axis of sensitivity of the sensors.

22. (Original) The pulsed eddy current sensor probe of Claim 21, wherein said sensors comprise giant magnetoresistance (GMR) sensors.

23. (Original) The pulsed eddy current sensor probe of Claim 21, further comprising a plurality of magnetic shieldings, each of said magnetic shieldings being disposed between said sensors and the respective one of said drive coils.

24. (Currently amended) A method of inspecting a part comprising:

positioning a linear array of sensors adjacent to a surface of the part, wherein each of the sensors has an axis of sensitivity aligned substantially normal to the surface of the part;

generating a magnetic flux that is oriented in a direction substantially along the axis of sensitivity of the sensors to transmit transient electromagnetic flux into the part; ~~and~~

sensing the transient electromagnetic flux in the part being inspected;

generating a differential output signal using one of the sensors,

wherein said generation of the magnetic field and said sensing and generating the differential output signal using one of the sensors are repeated for at least a subset of the sensors in the linear array to acquire a plurality of the differential output signals, each of the differential output signals comprising a positive and a negative output;

indexing and storing the differential output signals to indicate the respective sensors used to generate the differential output signals;

generating a calibration curve for each of the sensors;

calculating a plurality of informative parameter values for the differential output signals, each of the informative parameter values being associated with a respective one of the sensors; and

comparing the informative parameter values with the respective calibration curves.

25-26. (Cancelled)

27. (Original) The inspection method of Claim 24, wherein the linear array of sensors is disposed on a sensor array board, said inspection method further comprising performing on-board multiplexing to switch between the sensors.

28. (Previously amended) A method of inspecting a part comprising:

positioning a two dimensional sensor array adjacent to a surface of the part, wherein the two dimensional sensor array comprises a plurality of linear arrays of sensors, wherein each of the linear arrays is disposed on a respective one of a plurality of sensor array boards, and wherein each of the sensors has an axis of sensitivity aligned substantially normal to the surface of the part;

generating a magnetic flux that is oriented in a direction substantially along the axis of sensitivity of the sensors to transmit transient electromagnetic flux into the part;

sensing the transient electromagnetic flux in the part being inspected and generating a differential output signal using one of the sensors,

wherein said generation of the magnetic field and said sensing and generating the differential output signal using one of the sensors are repeated for at least a subset of the sensors in respective ones of at least a subset of the linear arrays to acquire a plurality of the differential output signals, each of the differential output signals comprising a positive and a negative output; and

performing on-board multiplexing to switch between the sensors within a respective one of the linear arrays.

29. (Original) The inspection method of Claim 28, further comprising indexing and storing the differential output signals to indicate the respective sensors used to generate the differential output signals.

30. (Original) The inspection method of Claim 29, further comprising:

generating a calibration curve for each of the sensors;

calculating a plurality of informative parameter values for the differential output signals, each of the informative parameter values being associated with a respective one of the sensors in the two dimensional sensor array; and

comparing the informative parameter values with the respective calibration curves.

31. (Cancelled)

32. (Previously amended) The inspection method of Claim 28, wherein a drive coil is disposed on each of the sensor array boards, the inspection method further comprising:

enabling a respective one of the sensor array boards;

selectively driving the drive coil on the respective sensor array board to generate the magnetic field for transmitting transient electromagnetic flux into the part; and

collecting the differential output signals using the sensors in the linear array on the respective sensor array board,

wherein the steps of enabling, selectively driving and collecting are repeated for each of the sensor array boards for collecting the differential output signals from the sensors within each of the linear arrays forming the two dimensional sensor array.